

Claims

1. A coding having at least one pair of mutually associated luminescent substances having first and second luminescent substances which emit in a joint emission range located outside the visible spectral range, the emission spectra of the first and second luminescent substances overlapping in at least a subrange of the stated emission range such that the emission spectrum of the first luminescent substance is complemented characteristically by the emission spectrum of the second luminescent substance.
2. The coding according to claim 1, characterized in that the stated emission range extends from about 750 nm to about 2500 nm, preferably from about 800 nm to about 2200 nm, particularly preferably from about 1000 nm to about 1700 nm.
3. The coding according to claim 1 or 2, characterized in that the first and/or second luminescent substance is formed on the basis of a doped host lattice.
4. The coding according to at least one of claims 1 to 3, characterized in that the first and/or second luminescent substance is formed on the basis of a host lattice doped with rare earth elements.
5. The coding according to claim 4, characterized in that the host lattice is doped with neodymium, erbium, holmium, thulium, ytterbium, praseodymium, dysprosium or a combination of said elements.
6. The coding according to at least one of claims 1 to 5, characterized in that the first and/or second luminescent substance is formed on the basis of a host lattice doped with a chromophore, the chromophore being selected from the group of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper and zinc.
7. The coding according to claim 6, characterized in that at least one of the host lattices is doped with a plurality of chromophores.

8. The coding according to at least one of claims 3 to 7, characterized in that at least one of the host lattices is formed by a mixed crystal.
9. The coding according to at least one of claims 3 to 8, characterized in that the first and second luminescent substances are formed on the basis of different host lattices which have crystal fields of different strength and which are each doped with the same dopant.
10. The coding according to at least one of claims 1 to 9, characterized in that the stated subrange where the emission spectra of the first and second luminescent substances complementarily overlap has a width of 200 nm or less, preferably 100 nm or less.
11. The coding according to at least one of claims 1 to 10, characterized in that the stated subrange where the emission spectra of the first and second luminescent substances complementarily overlap extends from about 850 nm to about 970 nm, or from about 920 nm to about 1060 nm, or from about 1040 nm to about 1140 nm, or from about 1100 nm to about 1400 nm, preferably from about 1100 nm to about 1250 nm, particularly preferably from about 1120 nm to about 1220 nm, or from about 1300 nm to about 1500 nm, or from about 1400 nm to about 1700 nm.
12. The coding according to at least one of claims 1 to 11, characterized in that the first and second luminescent substances have in the stated subrange at least one emission line in each case whose positions have a distance apart of about 30 nm or less, preferably about 20 nm or less, particularly preferably about 10 nm or less.
13. The coding according to at least one of claims 1 to 12, characterized in that the coding contains a further luminescent substance which has at least one emission line outside the stated subrange.

14. The coding according to claim 13, characterized in that the at least one emission line is outside the visible spectral range, the emission line preferably being in the infrared spectral range above 1100 nm.
15. The coding according to at least one of claims 1 to 14, characterized in that the coding system has a plurality of pairs of mutually associated luminescent substances as stated in claims 1 to 14.
16. The coding according to claim 15, characterized in that the subranges where the emission spectra of the first and second luminescent substances of a pair overlap each other complementarily are different for different pairs of mutually associated luminescent substances.
17. The coding according to at least one of claims 1 to 16, characterized in that the coding has at least a second luminescent substance which likewise emits in the stated subrange of the spectrum, and the emission spectrum of the first and/or second luminescent substance is complemented characteristically.
18. A coding system for value documents having at least one pair of mutually associated luminescent substances having first and second luminescent substances which emit in a joint emission range located outside the visible spectral range, the emission spectrum of the first and second luminescent substances overlapping in at least a subrange of the stated emission range such that the emission spectrum of the first luminescent substance is complemented characteristically by the emission spectrum of the second luminescent substance and value documents to be distinguished are equipped with different first and/or second luminescent substances.